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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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SILICON IMAGE, INC.				
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MENLO PARK, CA 94026				
EXAMINER				
DEWS, BROOKE J				
ART UNIT		PAPER NUMBER		
2182				
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04/15/2008		PAPER		

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/658,590

Applicant(s)

KIM ET AL.

Examiner

Brooke J. Dews

Art Unit

2182

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 17 January 2008.
2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-32 and 53-59 is/are pending in the application.
4a) Of the above claim(s) 33-52 is/are withdrawn from consideration.
5) ☐ Claim(s) _____ is/are allowed.
6) ☒ Claim(s) 1-7, 16-23, 27-31 and 53-59 is/are rejected.
7) ☒ Claim(s) 8-15, 24-26 and 32 is/are objected to.
8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
10) ☒ The drawing(s) filed on 08 September 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftperson's Final Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date 20040423
4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____

DETAILED ACTION

Election/Restrictions

Claims 33-52 are withdrawn from further consideration pursuant to 37 CFR 1.142(b), as being drawn to a nonelected Species II and III, there being no allowable generic or linking claim. Applicant's election without traverse of Species I in the reply filed on 1/17/2008 is acknowledged.

Specification

The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed.

The following title is suggested:

Coupling one of parallel and serial control signals to one of parallel and serial disk drive by common control bus that carries signals at double base data rate

Claim Rejections - 35 USC § 102

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1-5, 17-21, 53, 55 and 57 are rejected under 35 U.S.C. 102(e) as being anticipated by Frank Barth (US Publication 2003/0191872), hereafter Barth.

Regarding claims 1-5, 17-21, 53, 55 and 57 Barth discloses disk drive controller for disk drives comprising:

parallel logic (**via port assignment unit 335**) developing parallel control signals (**parallel data**

signals); (Paragraph [0026] and claim 14 of Barth)

serial logic (via port assignment unit 335) developing serial control signals (serial data signals);

and a multiplexer (via parallel/serial converter 205) coupling at least one of the parallel control signals (parallel data signal) and the serial control signals (serial data signal) to at least one of a parallel hard disk drive (parallel device) and a first serial hard disk drive (serial device) by a common control bus. (Paragraph [0028-29], Paragraph [0026], and claim 14 of Barth)

sending data to the first serial hard disk drive and the second serial hard disk drive at effectively double a base data rate (speed doublings); (Paragraph [0005-6])

and encoding (via port map register 340) additional commands (port identification data) onto the common control bus (same set of host bus addresses). (Paragraph [0025 and 0028])

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 6, 7, 16, 22, 23, 54, and 56-58 are rejected under 35 U.S.C. 103(a) as being unpatentable over Frank Barth (US Publication 2003/0191872), hereafter Barth in view of Ichiro Kumata (US Patent 6715010), hereafter Kumata.

Claims 6, 7, 16, 22, 23, 54, and 56-58 are rejected for the reasons set forth hereinabove for claims 1, 4, 17, 18, 21, 53, and 55, and further Barth discloses wherein:

the first the parallel hard disk drive (parallel device) is an ATA type; (Claim 1 of Barth)

the first serial hard disk drive (serial device) is an SATA type; (Claim 1 of Barth)

the multiplexer (**parallel/serial converter 205**) further coupling at least one of the parallel control signals and the serial control signals to a second serial hard disk drive by the common control bus;

wherein data is sent to the first serial hard disk drive and the second serial hard disk drive at double a base data rate (**speed doublings; Paragraph [0005-6]**), the doubling the base data rate comprising:

Barth does not explicitly disclose developing a sampling data clock; developing a first data stream at the base data rate; developing a second data stream at the base data rate; and multiplexing the first data stream to the common control bus on a rising edge of the base data clock and the second data stream to the common control bus on a falling edge of the base data clock so that the common control bus carries both the first data stream and the second data stream at double the base data rate; and calibrating phases of the first data stream and the second data stream comprising: (a) choosing a phase; (b) testing to see if the phase is accurate; (c) receiving results of the testing; (d) logging the results of the testing; (e) repeating steps (a) through (d) for at least one more phase; (f) finding a threshold rate based on the results of the testing; and (g) dividing the threshold rate by two; and the controller further encoding additional commands onto the common control bus, wherein the encoding comprising: determining at least one invalid command in used coding space of a coding standard; determining unused coding space; and encoding the at least one invalid command in the used coding space and at least one command in the unused coding space.

Kumata discloses developing a sampling data clock (**clock signal**); developing a first data stream at the base data rate; developing a second data stream at the base data rate; (**serial transfer paths**) and multiplexing the first data stream to the common control bus on a rising edge of the base data clock and the second data stream to the common control bus on a falling edge of the base data clock so that the common control bus carries both the first data stream and the second data stream at double the base data rate; (**Column 2 lines 50-67**)

and calibrating phases of the first data stream and the second data stream comprising:

(a) choosing a phase; (b) testing to see if the phase is accurate; (c) receiving results of the testing; (d) logging the results of the testing; (e) repeating steps (a) through (d) for at least one more phase; (f) finding a threshold rate based on the results of the testing; and (g) dividing the threshold rate by two; (**Column 18 lines 50-59; Claim 22 of Kumata**)

and the controller further encoding additional commands onto the common control bus, wherein the encoding comprising:

determining at least one invalid command in used coding space of a coding standard; determining unused coding space; and encoding the at least one invalid command in

the used coding space and at least one command in the unused coding space. **(Column 21 lines 57-67)**

Kumata and Barth are analogous art because they are from the same field of endeavor involving peripheral configuration.

It would have been obvious to one having ordinary skill in the art to combine the bus emulation methods of Kumata with the system of Barth. The motivation behind such a combination being for a serial transfer path to be optimized for a peripheral circuit requesting a high transfer rate and a peripheral circuit not requesting a high transfer rate. **(Column 22 lines 47-50 of Kumata)**

Allowable Subject Matter

Claims 8-15 and 23-32 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Keith Son (US Patent 7308512), James Akiyama (US Patent 7047357), John Stuart Hoch et al. (US Publication 2005/0251588), Sailesh Bissessur et al. (US Patent 6931457), and Terry Lynn Cole (US Patent 6671748) for storage controller systems.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Brooke J. Dews whose telephone number is 571-270-1013. The examiner can normally be reached on M-F 6:30-3:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Alford Kindred can be reached on (571) 272-4037. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/B. J. D./04/11/2008
Examiner, Art Unit 2182

/Niketa I. Patel/
Primary Examiner, Art Unit 2181